Abstract
We have developed and validated the Computational Modeling in Physics Attitudinal Student Survey (COMPASS), a new tool for characterizing how students think about learning computation. We also made preliminary measurements using several different populations of students learning computation in introductory calculus-based physics courses.

Dimensions of the COMPASS
- **Perceived Ability**: How confident students feel about using computational models or learning computation.
- **Perceived Utility**: Evaluate the utility of learning computation for their future work or of computation itself for helping to understand science.
- **Real-World Connections**: Students’ use of computation to their future career or in the “Real World”.
- **Sense-making**: The effort which students put forth to understand the computational model or the physical model that it describes.
- **Expert Behaviors**: Contrast what experts do when using or developing computational models to what students might do by performing expert-like actions.
- **Avoiding Novice Behaviors**: Contrast what experts do when using or developing computational models to what students might do by avoiding novice-like actions.
- **Personal Interest**: Students' own interest for learning computation.
- **Avoiding Rote**: Is it sufficient to simply memorize details about computation to learn it?

Populations Tested
In its validated form, the COMPASS has been given in only one semester before and after instruction to students taking:
- Intro. Mechanics at Georgia Tech (*N* = 316)
- Intro. E&M at Georgia Tech (*N* = 238)
- Intro. Mechanics at NCSU (*N* = 164)

In all these courses, students used the Matter & Interactions textbook, learning computation in their laboratory sections.

The Georgia Tech mechanics sections also solved a suite of computational homework problems throughout the semester.

Results – Georgia Tech Mech.
Responses are less favorable on the Post-instruction COMPASS. Choice of major and grade in course are significant influences.

Results – Georgia Tech E&M

Other Possible Uses
- Contrast students in intro. courses with more advanced (but still “novice”) students.
- Investigate alternative content delivery methods (e.g., experiential, design, etc.)

Future Work
More data must be collected to determine the reliability of the COMPASS. Responses to the COMPASS will be collected at Purdue University and compared to results from Georgia Tech.

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